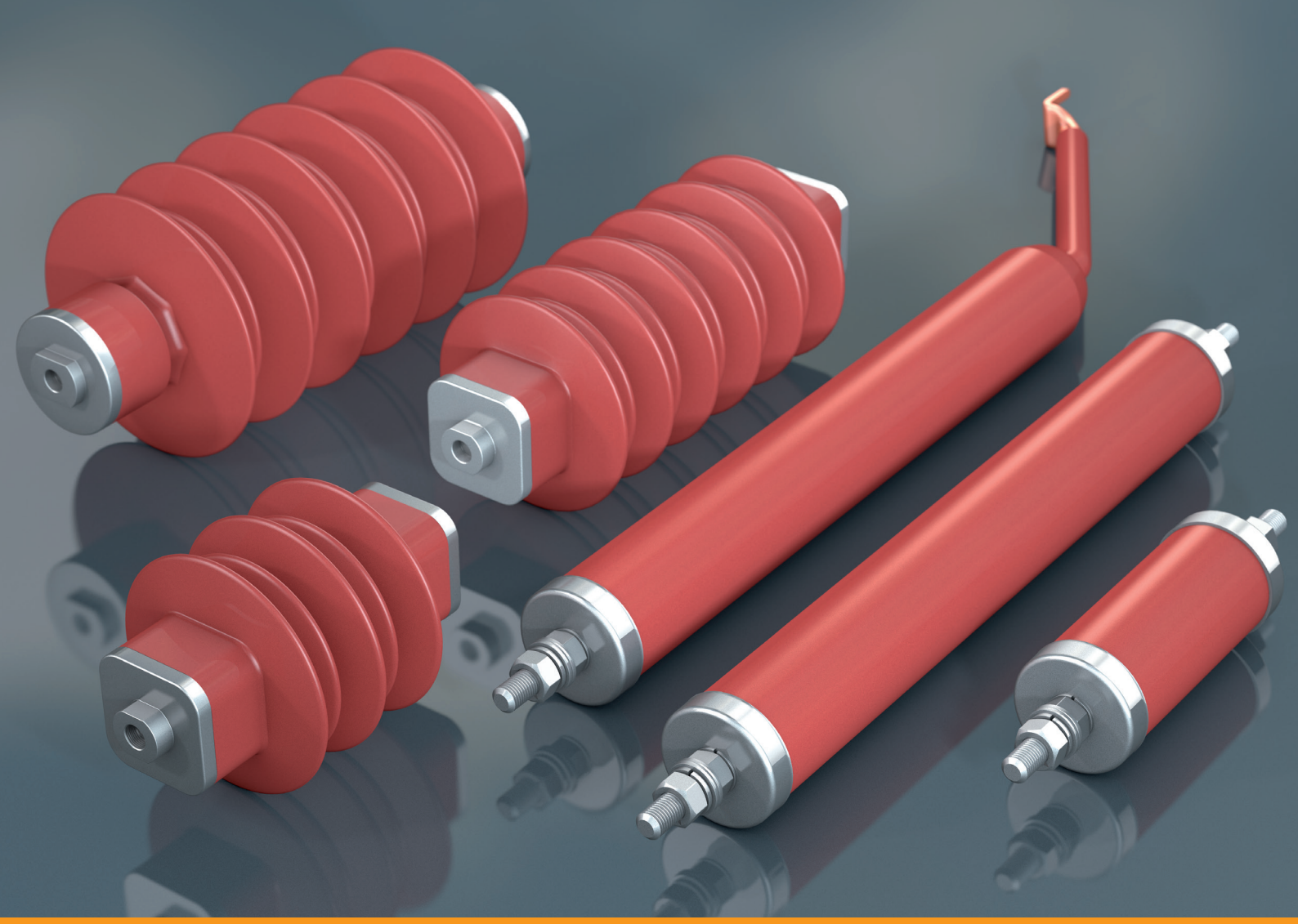


Raychem MV Outdoor Surge Arresters

Raychem
from TE Connectivity

Raychem MV Outdoor Surge Arresters

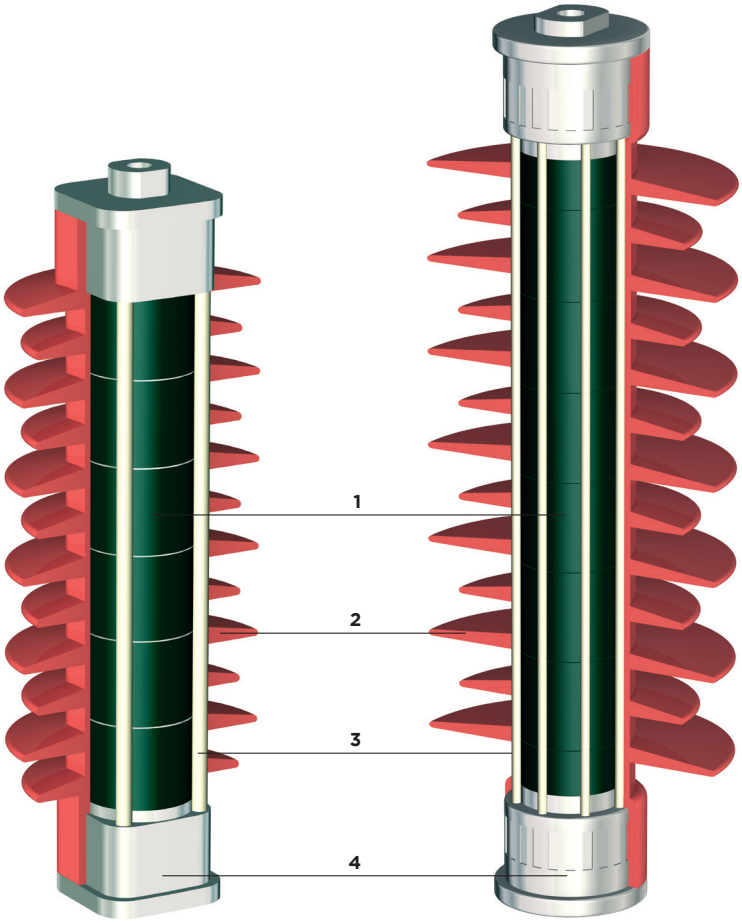
Raychem pioneered the development of polymeric housed surge arresters in the early 1980's and since 1986 have a proven service experience across the globe, operating in the worlds toughest environments.
Raychem HDA Ethyl Vinyl Acetate (EVA) surge arresters have been designed and tested to meet our customers toughest environmental conditions and to meet the requirements of IEC60099-4. The final HDA qualifications are performed by an independent laboratory in Europe. HDA is the latest gapless, zinc oxide arrester family from Raychem.

At the core of the Raychem HDA design is our improved ZnO varistor disk, which has superior thermal and electrical characteristics and stability. This new varistor and HDA design combination results in superior energy handling and TOV performance.

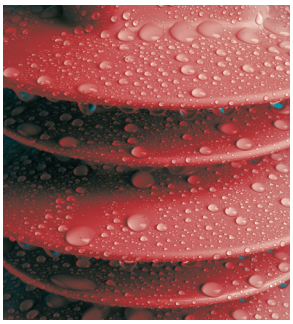
The crimped structural construction offers a light weight product with optimal mechanical strength.
The manufacturing process ensures void free construction and optimum interface sealing. This is achieved by bonding the EVA housing directly to the ZnO discs and aluminium fittings using a Raychem proprietary bonding solution.

Features of our new hydrophobic EVA HDA design are:
- Alternating sheds for superior pollution flash over resistance
- Superior TERT performance
- Constant voltage: 4.5kV, >360min
  - Stepped voltage: >300min
  - All eventual failures by erosion only, ie no tracking in step voltage test
- Housing tested to IEC 1000hr salt fog test

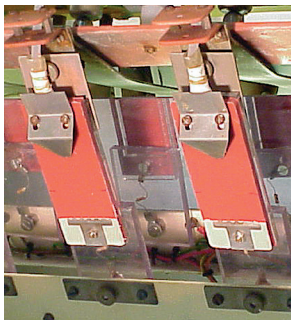
Benefits
- Superior TOV performance
- Safe, non-shattering failure in the short circuit test by pre-failing to higher fault currents
- High energy handling capability
- Tested in accordance with IEC60099-4
- Superior protection margins
- Direct molded housing to prevent moisture ingress
- Safe non-shattering short circuit behavior to higher current levels
- Maintenance free
- Hydrophobic EVA housing
- Excellent cantilever and tensile performance
- Excellent mechanical, vibration and impact withstand capability
- Quality design and manufacturing, ISO 9001 and 14001 compliant



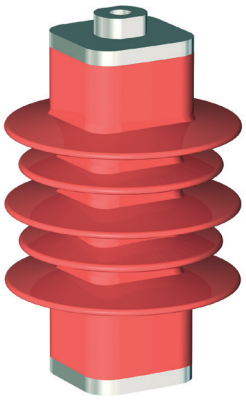
The construction of the HDA design comprises of:
1 ZnO, (Zinc Oxide) varistors
2 Raychem HDA proprietary EVA housing
3 Flame retardant FRP structure
4 Corrosion resistant aluminium fittings

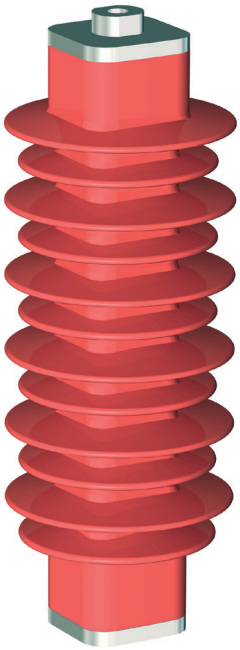

Excellent hydrophobicity


Safe non-shattering failure mode


Superior TERT performance

Discharge Class 1 Surge Arrester – HDA-MA





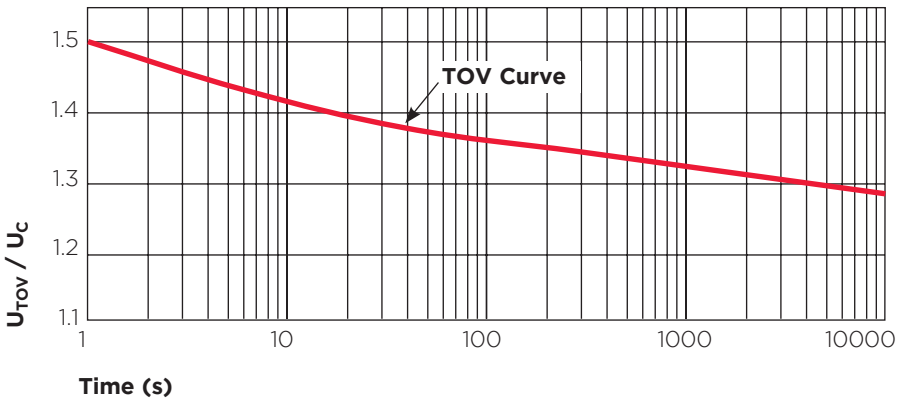
Application

Protection of MV networks and equipment from lightning and switching surge related over-voltages in areas with relatively high iso-keraunic levels. Suitable for both outdoor and indoor use to protect transformers and cable end terminations.

Generic technical data

HDA-xxMA series		3-24 kV Uc
Rated discharge current (8/20µs)		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10µs)		100 kA
Long duration current impulse (2000µs)		400 A
10 second temporary overvoltage, (U_{TOV}/U_C)		1.42
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)		40 kA
Energy	2 long duration impulses 2 high current impulses	4.2 kJ/kV Uc 6.8 kJ/kV Uc
Service conditions	Ambient temperature	- 60°C to + 60°C

Temporary overvoltage (TOV) of HDA-xxMA with prior energy



Samples are pre-heated to a temperature of 60° C according to IEC 60099-4. Samples were subjected to a pre-stress equivalent to one high current impulse of 100kA, 4/10 µs as per switching surge operating duty test.

U_{TOV} = TOV withstand voltage;
U_C = continuous operating voltage

Discharge Class 1 Surge Arrester – HDA-MA

HDA-MA Standard electrical data

HDA-xxMA	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms					
			Lightning (8/20µs)			Steep lightning (1/20µs)	Switching (30/60µs)	
			5kA	10kA	20kA	10kA	125A	500A
03	3	3.75	9.3	9.9	10.9	10.2	7.4	7.9
04	4	5	12.4	13.2	14.6	13.6	9.8	10.5
06	6	7.5	18.6	19.8	21.8	20.4	14.8	15.7
08	8	10	24.8	26.4	29.1	27.2	19.7	21
09	9	11.25	27.9	29.7	32.8	30.6	22.1	23.6
10	10	12.5	31	33	36.4	34	24.6	26.2
12	12	15	37.2	39.6	43.7	40.8	29.5	31.4
18	18	22.5	55.8	59.4	65.5	61.2	44.3	47.2
20	20	25	62	66	72.8	68	49.2	52.4
21	21	26.25	65.1	69.3	76.4	71.4	51.7	55
24	24	30	74.4	79.2	87.4	81.6	59	62.9

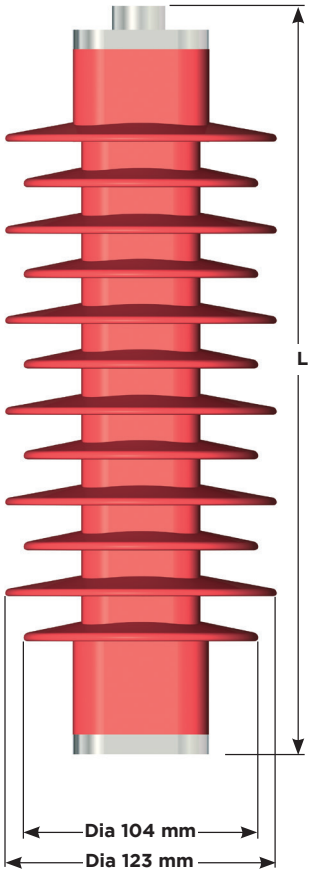
Uc: Continous Voltage; Ur: Rated Voltage; Ures: Residual Voltage

HDA-xxMA Standard housing parameters

HDA-xxMA	Sheds	Impulse voltage 1.2/50µs (kV)	Power frequency withstand voltage, wet (kV)	Flash over distance (mm)	Creepage length (mm)	Height L (mm)	Weight (approx) (kg)
03	5	106	47	176	380	183	1.8
04	5	106	47	176	380	183	1.8
06	5	106	47	176	380	183	1.8
08	5	106	47	176	380	183	1.8
09	5	106	47	176	380	183	1.8
10	5	106	47	176	380	183	1.8
12	5	106	47	176	380	183	1.8
18	12	190	93	310	830	316	3.25
20	12	190	93	310	830	316	3.25
21	12	190	93	310	830	316	3.25
24	12	190	93	310	830	316	3.25

HDA-xxML Extended housing parameters

HDA-xxML	Sheds	Impulse voltage 1.2/50µs (kV)	Power frequency withstand voltage, wet (kV)	Flash over distance (mm)	Creepage length (mm)	Height L (mm)	Weight (approx) (kg)
03	12	190	93	310	830	316	3.25
04	12	190	93	310	830	316	3.25
06	12	190	93	310	830	316	3.25
08	12	190	93	310	830	316	3.25
09	12	190	93	310	830	316	3.25
10	12	190	93	310	830	316	3.25
12	12	190	93	310	830	316	3.25



Notes:

Mechnical strength data

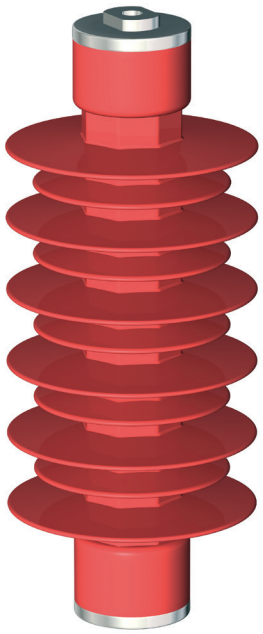
Cantilever	Nm	350
Tensile	kN	2
Torque	Nm	50

For accessory and ordering information, please refer to page 6

Discharge Class 1 Surge Arrester – HDA-M

Application:

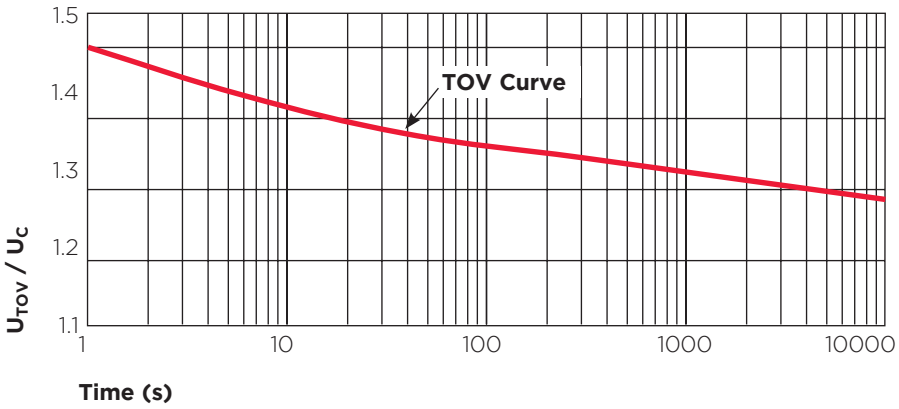
Protection of MV networks and equipment from lightning and switching surge related over-voltages in areas with relatively high iso-keraunic levels. Suitable for both outdoor and indoor use to protect transformers and cable end terminations.

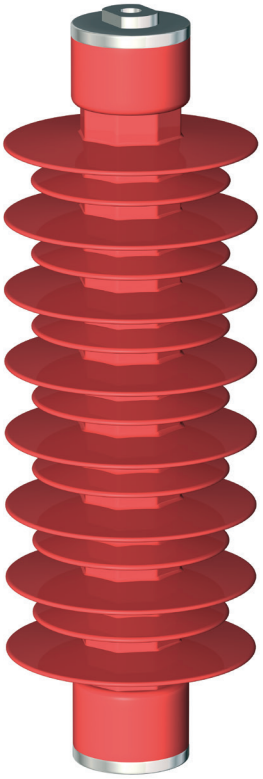


Generic technical data

HDA-xxM series		26-41 kV Uc
Rated discharge current (8/20µs)		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10µs)		100k A
Long duration current impulse (2000µs)		400 A
10 second temporary overvoltage, (U_{TOV}/U_C)		1.42
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)		40 kA
Energy	2 long duration impulses 2 high current impulses	4,2 kJ/kV Uc 6.8 kJ/kV Uc
Service conditions	Ambient temperature	- 60°C to + 60°C

Temporary overvoltage (TOV) of HDA-xxM with prior energy





Samples are pre-heated to a temperature of 60° C according to IEC 60099-4. Samples were subjected to a pre-stress equivalent to one high current impulse of 100kA, 4/10 µs as per switching surge operating duty test.

U_{TOV} = TOV withstand voltage;
U_C = continuous operating voltage

Discharge Class 1 Surge Arrester – HDA-M

HDA-M Standard electrical data

HDA-xxM	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms					
			Lightning (8/20µs)			Steep lightning (1/20µs)	Switching (30/60µs)	
			5kA	10kA	20kA	10kA	125A	500A
26	26	32.5	80.6	85.8	94.6	88.4	64	68.1
27	27	33.75	83.7	89.1	98.3	91.8	66.4	70.7
29	29	36.25	89.9	95.7	105.6	98.6	71.3	76
30	30	37.5	93	99	109.2	102	73.8	78.6
33	33	41.25	102	108.9	120.1	112.2	81.2	86.5
36	36	45	112	118.8	131	122.4	88.6	94.3
39	39	48.75	121	128.7	142	132.6	95.9	102
40	40	50	124	132	145.6	136	98.4	105
41	41	51.25	127	135.3	149.2	139.4	101	107

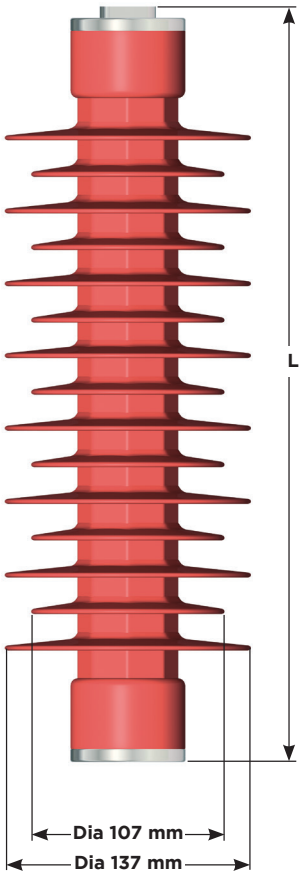
Uc: Continous Voltage; Ur: Rated Voltage; Ures: Residual Voltage

HDA-xxM Standard housing parameters

HDA-xxM	Sheds	Impulse voltage 1.2/50µs (kV)	Power frequency withstand voltage, wet (kV)	Flash over distance (mm)	Creepage length (mm)	Height L (mm)	Weight (approx) (kg)
26	11	204	98	339	970	343	4
27	11	204	98	339	970	343	4
29	11	204	98	339	970	343	4
30	11	204	98	339	970	343	4
31	13	228	110	378	1125	383	4.5
33	13	228	110	378	1125	383	4.5
36	13	228	110	378	1125	383	4.5
39	15	250	122	418	1279	423	5
40	15	250	122	418	1279	423	5
41	15	250	122	418	1279	423	5

HDA-xxML Extended housing parameters

HDA-xxML	Sheds	Impulse voltage 1.2/50µs (kV)	Power frequency withstand voltage, wet (kV)	Flash over distance (mm)	Creepage length (mm)	Height L (mm)	Weight (approx) (kg)
26	13	228	110	378	1125	383	4.5
27	13	228	110	378	1125	383	4.5
29	13	228	110	378	1125	383	4.5
30	15	250	122	418	1279	423	5
31	15	250	122	418	1279	423	5
33	15	250	122	418	1279	423	5
36	15	250	122	418	1279	423	5



Notes:

Mechnical strength data

Cantilever	Nm	250
Tensile	kN	2
Torque	Nm	50

For accessory and ordering information, please refer to page 6

Accessories for Class 1 Surge Arrester (Type HDA)

HDA series naming and order query description:

Example: **HDA – 12MA – MEL**

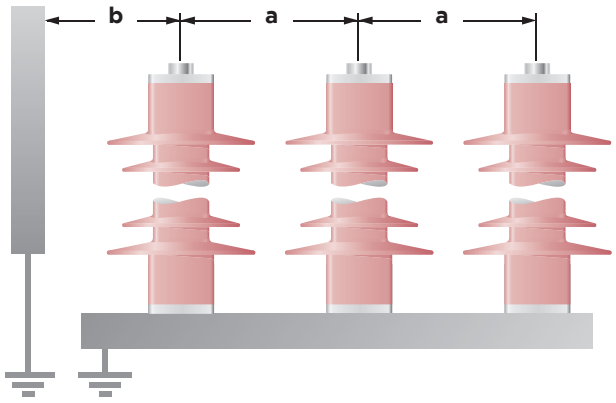
U_c: 3, 4, 6, 8, 9, 10, 12, 18, 20, 21, 24, 26, 27, 29, 30, 33, 36, 40, 41

Housing creepage:
M/MA = standard creepage
ML/LA = extended creepage

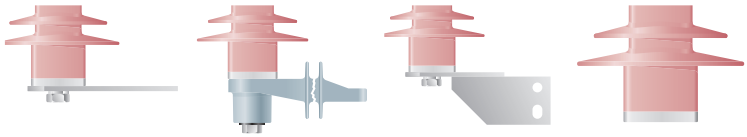
Accessory selection
M = Mounting bracket
E = Earth connection
L = Line connection

Installation Requirements

System Voltage U_m	ph/ph (a)	ph/ground (b)
12	185	165
24	315	295
36	510	490



M Mounting accessories



A xx
Straight 2 hole mounting bracket

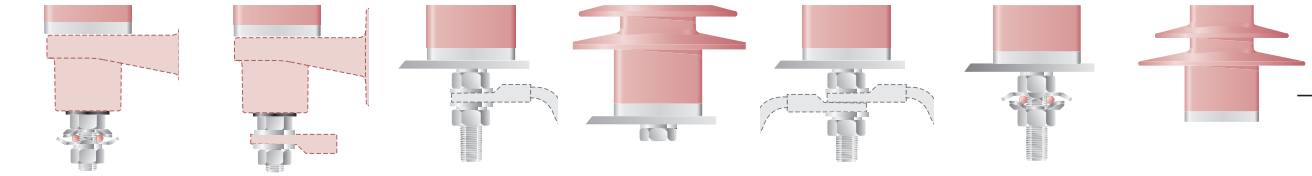
B xx
Insulating bracket

C xx
DIN metal bracket

N xx
No stud.
No accessories

HDA - □ - □□□

E Earth lead accessories



x **D** x
Disconnect & M accessory

x **E** x
Disconnect & F accessory

x **F** x
Exposed stud for lug connection

x **H** x
M12 cap screw & spring washer

x **L** x
Exposed stud for 2 lug connection

x **M** x
Exposed stud for line lead connection

x **N** x
No stud.
No accessories

L Line lead accessories

xx **C**
M12 cap screw & spring washer

xx **F**
Exposed stud for lug connection

xx **H**
Exposed stud for 2 lug connection

xx **M**
Exposed stud for line lead connection

xx **N**
No stud.
No accessories

xx **P**
S-Clamp

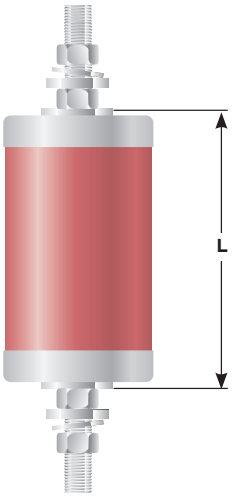
xx **Q**
L-Clamp

Additional accessory options available on request. Please contact: surgearresters@te.com with your specific requirement.
All fastners M12 unless stated otherwise.

Raychem MV Indoor Surge Arresters

Raychem MV Surge Arresters MPA for Indoor Applications

For motor-connection boxes
MPA type
Design for the specific requirements of electric motors. A robust, non-tracking housing plus the high energy handling capabilities of the TE Connectivity arrester family make it the ideal choice for the designer.



Generic technical data

MPA-xx series		2-12 kV Uc
Rated discharge current (8/20µs)		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10µs)		100 kA
Long duration current impulse (2000µs)		400 A
10 second temporary overvoltage (U_{TOV}/U_C)		1.3
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)		16 kA
Energy	line discharge impulse high current impulse	2.0 kJ/kV Uc 3.2 kJ/kV Uc

MPA	Height L (mm)
MPA-02	95.5
MPA-03	107.5
MPA-04	115.5
MPA-06	137.5
MPA-07	144.5
MPA-09	166.5
MPA-10	178.5
MPA-12	198.5

Mechanical strength data

Cantilever	200 Nm
Tensile	1000 N
Torque	58 Nm

MPA Standard electrical data

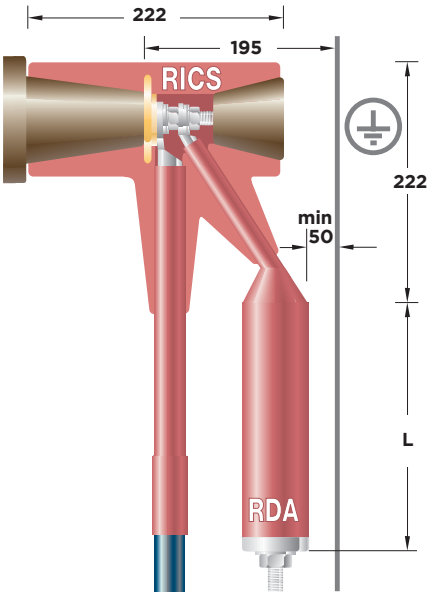
MPA	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20µs)				Steep lightning (1/20µs)	Switching (30/60µs)	
			5kA	10kA	20kA	40kA	10kA	125A	500A
MPA-02	2	2.5	6.1	6.6	7.3	8.3	7.1	4.9	5.2
MPA-03	3	3.75	9.2	9.9	11.0	12.5	10.7	7.3	7.8
MPA-04	4	5	12.3	13.2	14.6	16.6	14.2	9.8	10.4
MPA-06	6	7.5	18.5	19.9	21.9	24.9	21.3	14.7	15.6
MPA-07	7	8.75	21.6	23.2	25.5	29.1	24.9	17.1	18.2
MPA-09	9	11.25	27.7	29.9	32.8	37.4	32.0	22.0	23.4
MPA-10	10	12.5	30.8	33.2	36.4	41.6	35.6	24.4	26.0
MPA-12	12	15	37.0	39.8	43.7	49.9	42.7	29.3	31.2

Arresters for other voltages are available on request.

Raychem MV Surge Arresters RDA for Indoor Applications

In gas-insulated switchgear systems RDA type

Modern gas-insulated switchgear connected to combined underground and overhead distribution systems are sensitive to effects like transient voltage doubling. An arrester installed right at the cable end juncture will clamp the voltage to a level which does not put the switchgear at risk. The RDA surge arrester, together with the Raychem RICS connection system for gas-insulated switchgear, facilities at hermetically sealed integration of the arrester and the cable termination to be connected to a switchgear. Compact design and easy installation are the special features of this product line.



Generic technical data

RDA-xx series		6-26 kV Uc
Rated discharge current (8/20µs)		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10µs)		100 kA
Long duration current impulse (2000µs)		400 A
10 second temprary overvoltage (U_{TOV}/U_C)		1.3
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)		16 kA
Energy	line discharge impulse high current impulse	2.0 kJ/kV Uc 3.2 kJ/kV Uc

Mechanical strength data

Cantilever	200 Nm
Tensile	1000 N
Torque	58 Nm

RDA	Height L (mm)
RDA-06	134
RDA-07	141
RDA-09	163
RDA-10	175
RDA-12	195
RDA-15	296
RDA-18	326
RDA-21	356
RDA-24	400
RDA-26	398

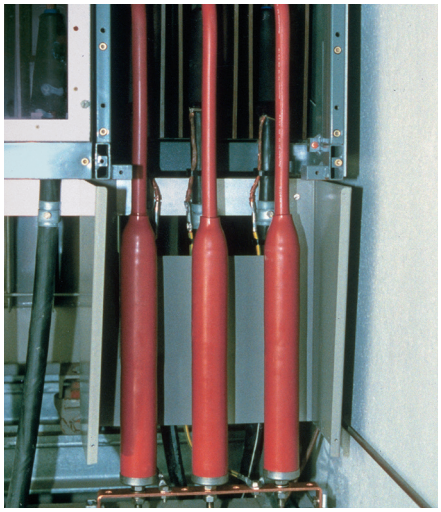
RDA Standard electrical data

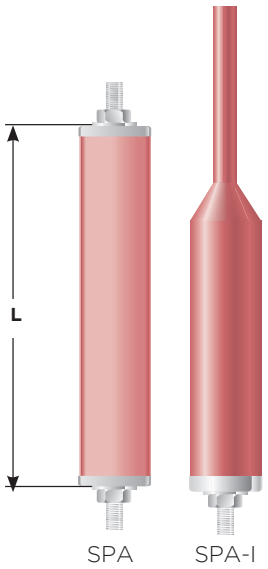
RDA	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20µs)				Steep lightning (1/20µs)	Switching (30/60µs)	
			5kA	10kA	20kA	40kA	10kA	125A	500A
RDA-06	6	7.5	18.5	19.9	21.9	24.9	21.3	14.7	15.6
RDA-07	7	8.75	21.6	23.2	25.5	29.1	24.9	17.1	18.2
RDA-09	9	11.25	27.7	29.9	32.8	37.4	32.0	22.0	23.4
RDA-10	10	12.5	30.8	33.2	36.4	41.6	35.6	24.4	26.0
RDA-12	12	15	37.0	39.8	43.7	49.9	42.7	29.3	31.2
RDA-15	15	18.75	46.2	49.8	54.6	62.4	53.4	36.6	39.0
RDA-18	18	22.5	55.4	59.8	65.5	74.9	64.1	43.9	46.8
RDA-21	21	26.25	64.7	69.7	76.4	87.4	74.8	51.2	54.6
RDA-24	24	30	73.9	79.7	87.4	99.8	85.4	58.6	62.4
RDA-26	26	32.5	80.1	86.3	94.6	108.2	92.6	63.4	67.6

Arresters for other voltages are available on request.

Raychem MV Surge Arresters SPA for Indoor Applications

In air-spaced insulated switchgear systems SPA type
This is a compact arrester with high mechanical strength is fully track resistant and can provide flashover resistance in damp indoor conditions. The SPA type arrester is also available with a thick-wall insulated integrated line lead, which allows to considerably reduce the clearances between the arresters and to the earth. This line lead is available in lengths of 250mm, 500mm and 750mm.
This SPA-I type arrester is the ideal solution when retrofitting compact switchgears with arresters.





Generic technical data

SPA-xx series		6-40 kV Uc
Rated discharge current (8/20µs)		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10µs)		100 kA
Long duration current impulse (2000µs)		400 A
10 second temporary overvoltage (U_{TOV}/U_C)		1.3
High current short circuit: (pre-failing method) (Safe non-shattering failure mode)		16 kA
Energy	line discharge impulse high current impulse	2.0 kJ/kV Uc 3.2 kJ/kV Uc

Mechanical strength data

Cantilever	200 Nm
Tensile	1000 N
Torque	58 Nm

SPA	Height L (mm)
SPA-06	137.5
SPA-09	166.5
SPA-12	198.5
SPA-15	299.5
SPA-18	329.5
SPA-21	359.5
SPA-24	392.5
SPA-30	520.5
SPA-33	619
SPA-36	581
SPA-40	591

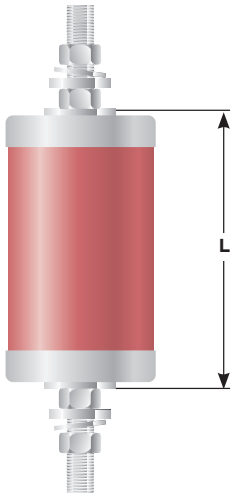
SPA Standard electrical data

SPA / SPA-I	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20µs)				Steep lightning (1/20µs)	Switching (30/60µs)	
			5kA	10kA	20kA	40kA	10kA	125A	500A
SPA-06	6	7.5	18.5	19.9	21.9	24.9	21.3	14.7	15.6
SPA-09	9	11.25	27.7	29.9	32.8	37.4	32.0	22.0	23.4
SPA-12	12	15	37.0	39.8	43.7	49.9	42.7	29.3	31.2
SPA-15	15	18.75	46.2	49.8	54.6	62.4	53.4	36.6	39.0
SPA-18	18	22.5	55.4	59.8	65.5	74.9	64.1	43.9	46.8
SPA-21	21	26.25	64.7	69.7	76.4	87.4	74.8	51.2	54.6
SPA-24	24	30	73.9	79.7	87.4	99.8	85.4	58.6	62.4
SPA-30	30	37.5	92.4	99.6	109.2	124.8	106.8	73.2	78.0
SPA-33	33	41.25	101.6	109.6	120.1	137.3	117.5	80.5	85.8
SPA-36	36	45	110.9	119.5	131.0	149.8	128.2	87.8	93.6
SPA-40	40	50	123.2	132.8	145.6	166.4	142.4	97.6	104.0

Arresters for other voltages are available on request.

CPA Surge Arresters for Cable Sheath Protection System

High-voltage cable sheath protection system CPA
Designed to the specific requirements in cable sheath protection. A robust, non tracking housing plus the high energy handling capabilities of the Raychem arrester family make it the ideal choice for the designer.



Generic technical data:

CPA-xx series		1-8 kV Uc
Rated discharge current (8/20µs):		10 kA
Line discharge class according to IEC 60099-4		Class 1
Operating duty impulse withstand current (4/10µs):		100 kA
Long duration current impulse (2000µs):		400 A
10 second temporary overvoltage (U_{TOV}/U_C)		1.3P
Energy	line discharge impulse	2.0 kJ/kV Uc
	high current impulse	3.2 kJ/kV Uc

CPA	Height L (mm)
CPA-01	85.5
CPA-02	95.5
CPA-03	107.5
CPA-04	115.5
CPA-05	126.5
CPA-06	137.5
CPA-07	144.5
CPA-08	151.5

Mechanical strength data

Cantilever	200 Nm
Tensile	1000 N
Torque	58 Nm

CPA Standard electrical data

CPA	U continuous kV(r.m.s)	U rated kV(r.m.s)	U residual in kV when tested to the following impulse waveforms						
			Lightning (8/20µs)				Steep lightning (1/20µs)	Switching (30/60µs)	
			5kA	10kA	20kA	40kA	10kA	125A	500A
CPA-01	1	1.25	3.1	3.3	3.6	4.2	3.6	2.4	2.6
CPA-02	2	2.5	6.1	6.6	7.3	8.3	7.1	4.9	5.2
CPA-03	3	3.75	9.2	9.9	11.0	12.5	10.7	7.3	7.8
CPA-04	4	5	12.3	13.2	14.6	16.6	14.2	9.8	10.4
CPA-05	5	6.25	15.4	16.6	18.2	20.8	17.8	12.2	13.0
CPA-06	6	7.5	18.5	19.9	21.9	24.9	21.3	14.7	15.6
CPA-07	7	8.75	21.6	23.2	25.5	29.1	24.9	17.1	18.2
CPA-08	8	10	24.6	26.6	29.1	33.3	28.5	19.5	20.8

About TE Connectivity

TE Connectivity is a global, $14 billion company that designs and manufactures approximately 500,000 products that connect and protect the flow of power and data inside the products that touch every aspect of our lives. Our nearly 100,000 employees partner with customers in virtually every industry – from consumer electronics, energy and healthcare, to automotive, aerospace and communication networks – enabling smarter, faster, better technologies to connect products to possibilities.

More information on TE Connectivity can be found at: www.te.com

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TE Energy – innovative and economical solutions for the electrical power industry: cable accessories, connectors & fittings, insulators & insulation, surge arresters, switching equipment, street lighting, power measurement and control.

LV/MV Product Management
TE Connectivity Limerick
International Science Centre
Block 1, University Of Limerick (N.T.P.)
Castletroy
Co. Limerick. Ireland

Phone: + 353 61 470 800
Email: surgearresters@te.com

energy.te.com

TE connectivity ENERGY